

Audit



Report

OFFICE OF THE INSPECTOR GENERAL

**SUMMARY REPORT ON CONTRACTOR
RECOMMENDATIONS FOR SPARES PROVISIONING**

Report Number 93-016

October 30, 1992

Department of Defense

The following acronyms are used in this report.

AFAA.....	Air Force Audit Agency
AFLC.....	Air Force Logistics Command
ASD (P&L).....	Assistant Secretary of Defense (Production and Logistics)
GAO.....	General Accounting Office
PPG.....	Provisioning Policy Group



INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202

October 30, 1992

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (PRODUCTION
AND LOGISTICS)

SUBJECT: Summary Audit Report on Contractor Recommendations
for Spares Provisioning (Report No. 93-016)

We are providing this final report for your information and use. It addresses our audits on the timeliness and use of contractor forecasting factors in spares provisioning for the Army Apache helicopter, the Navy F/A-18 C/D aircraft, and the Air Force F-16 C/D aircraft. This final report also includes summaries of the Air Force Audit Agency's evaluations of contractor forecasting factors in spares provisioning for the C-17 and B-2 aircraft. The audit was requested by your Provisioning Policy Group. Comments on a draft of this report were considered in preparing this final report.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Therefore, your office is requested to provide final comments as discussed on page 9 within 60 days of the date of this report.

This report identifies no quantifiable monetary benefits. Potential monetary savings for the F-16 C/D aircraft were identified in a separate report to the Air Force. A summary of other benefits resulting from this report is in Appendix E.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. James L. Koloshey at (703) 614-6225 (DSN 223-6225) or Mr. Charles E. Sanders at (703) 614-6219 (DSN 224-6219). The planned distribution of this report is listed in Appendix G.

A handwritten signature in black ink, reading "Robert J. Lieberman".

Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosure

cc:
Secretary of the Army
Secretary of the Navy
Secretary of the Air Force

Office of the Inspector General, DoD

AUDIT REPORT NO. 93-016
(Project No. OLA-0025)

October 30, 1992

SUMMARY REPORT ON
CONTRACTOR RECOMMENDATIONS FOR SPARES PROVISIONING

EXECUTIVE SUMMARY

Introduction. This report addresses our audits on the Military Departments use of contractor recommendations in determining procurement requirements for spares provisioning of new weapon systems. The report also summarizes findings on this subject that were reported by the Air Force Audit Agency on the C-17 and B-2 aircraft.

Objective. Our overall objective was to determine if the Military Departments were receiving adequate and timely data on provisioning of spares from contractors to serve as a sound basis for initial purchase of spares for new weapon systems. We also determined if the Military Departments had effective internal control procedures in place to review and evaluate the quality of contractor estimates of forecasting factors before approving procurements of the initial spares quantities. To accomplish the audit objectives, we focused on spares provisioning for the Army Apache helicopter, Navy F/A-18 C/D aircraft, and the Air Force F-16 C/D aircraft.

Audit Results. The Military Departments did not effectively use contractor-provided maintenance factors in determining provisioning and procurement requirements for aircraft spares. Pertinent requirements documentation on contractor factors was not retained, and post-evaluations of spares provisioning were not made to determine the adequacy of contractor factors and Government factors used in provisioning. As a result, significant over-procurement of provisioned items, totaling about \$43 million, has occurred for the F-16 C/D aircraft. Other significant over- and under-procurements of provisioned items totaling \$30 million and \$20 million, respectively, were identified for the Apache helicopter.

Internal Controls. Internal controls were not established or effective to ensure that contractor forecasting factors for spares provisioning were received and reviewed promptly and systematically. Material weaknesses are discussed in the Finding and additional details of our review are provided in the internal controls section of Part I of this report.

Potential Benefits of Audit. Our separate report covering the results of audit for the F-16 C/D aircraft identified a potential cost avoidance of \$10.3 million. No additional quantifiable monetary benefits are claimed in this report. Other benefits of audit are summarized in Appendix E.

Summary of Recommendations. We recommended that the Assistant Secretary of Defense (Production and Logistics) revise a draft materiel management directive to provide that the Military Departments validate and use contractor-provided forecasting factors in determining provisioning and procurement requirements unless otherwise justified, to perform post-evaluations of provisioning, and to establish a centrally managed data base for results of post-evaluations.

Management Comments. The Assistant Secretary of Defense (Production and Logistics) generally concurred with the recommendations, but the description of planned action was incomplete for Recommendation 1. We request the Assistant Secretary to provide additional information on planned action for Recommendation 1. and target dates for completion of planned actions for all recommendations by January 4, 1993. The Assistant Secretary's comments are further discussed in Part II, and the complete text of the comments is in Part IV of this report.

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This report was prepared by the Logistics Support Directorate, Office of the Assistant Inspector General for Auditing, DoD. Copies of the report can be obtained from the Information Officer, Audit Planning and Technical Support Directorate, at (703) 614-6303.

PART I - INTRODUCTION

Background

Provisioning is the management process of determining and acquiring the range and quantity of support items necessary to operate and maintain an end item, such as an aircraft, a tank, or a ship, for an initial period of service. Primary Defense guidance for provisioning is contained in DoD Directive 4140.40, "Provisioning of End Items of Material," June 28, 1983, (to be combined with DoD Directive 4140.1, "Inventory Management Policies," October 12, 1956) and DoD Instruction 4140.42, "Determination of Requirements for Spares and Repair Parts Through the Demand Development Period," July 28, 1987.

The initial period of service (also referred to as the demand development period) is usually 2 years after the initial operational capability has been established for the system. At the beginning of the support period, spares provisioning requirements are based on contractor identification of items to be stocked and forecasts of maintenance and other usage factors. Follow-on provisioning requirements should be based on a combination of forecasted and actual usage. However, by the end of the support period, follow-on provisioning requirements should be based solely on actual usage.

The audit was requested by the Assistant Secretary of Defense (Production and Logistics) [ASD (P&L)], Provisioning Policy Group (PPG), to assist the PPG in its continuing review of the provisioning process within DoD and in formulating new provisioning policy. To evaluate the reliability of contractor recommendations, we, along with the PPG, selected three aircraft systems: the Army Apache (AH-64) helicopter, the Navy Hornet (F/A-18 C/D) aircraft, and the Air Force Fighting Falcon (F-16 C/D) aircraft. This report, the final in a series of four, summarizes the audits of these systems and the Air Force Audit Agency's (AFAA) reports on audits of C-17 and B-2 aircraft initial provisioning. This report also addresses the need for additional DoD policy on spares provisioning.

Objectives

Our overall audit objective was to determine if the Military Departments were receiving adequate and timely data on provisioning of spares from contractors to serve as a sound basis for initial purchase of spares for new weapon systems. We also determined if the Military Departments had effective internal

control procedures in place to review and evaluate the quality of contractor estimates and forecasting factors before approving procurement of the initial spares quantities. To accomplish the audit objectives, we focused on spares provisioning for the Apache helicopter, F/A-18 C/D aircraft, and F-16 C/D aircraft.

Scope

To accomplish the audit objectives, we evaluated DoD and Military Department policies regarding the solicitation, review, verification, and use of contractor recommendations for spares provisioning. (We limited our review to spares that comprised the majority [dollar value] of provisioned items and were unique to the systems reviewed.) To evaluate the adequacy of contractor recommendations for provisioning of spares, we randomly selected for review 180 items, totaling \$158.2 million, for the Apache helicopter; and judgmentally selected 27 items, totaling \$5.8 million, for the F/A-18 C/D aircraft and 23 items, totaling \$92.7 million for the F-16 C/D aircraft.

For the Apache helicopter, we reviewed supply management studies that were ongoing at the time of audit. Our review was to determine whether items on hand and due-in quantities were significantly over or under the requirements objective (the maximum amount of assets authorized on hand and on order for an item at the wholesale level). We were unable to validate the quantity computed as the requirements objective due to lack of data. Our review was limited because complete documentation regarding provisioning and procurement requirements data; contractor provisioning estimates; and other factors, such as aircraft densities, used in determining provisioning and procurement requirements were not retained by logistics managers and the contractor.

Our audit of the F/A-18 aircraft was limited to the review of procedures for contractor recommendations for spares provisioning factors processed from 1986 through 1988. This limitation was due to the lack of supporting documentation for review and the use of contractor factors.

For each F-16 aircraft line item selected, we reviewed contractor maintenance factors and other forecasting factors shown on Air Force data worksheets to determine the extent that contractor maintenance factors were used in determining provisioning requirements from FY 1982 through FY 1990. We reviewed the basis of adjustments made to contractor maintenance factors.

Additionally, we reviewed supply management studies on file to determine the accuracy of contractor provided maintenance factors.

These economy and efficiency audits were made from May 1990 through July 1991 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly, included such tests of internal controls as were considered necessary. Activities visited or contacted during the audit are listed in Appendix F.

This report also summarizes findings on contractor recommendations for spares provisioning in AFAA Reports of Audit for "Management of C-17 Initial Provisioning," Project 90063040, December 1991, and "B-2 Initial Provisioning," Project 90063042, January 17, 1992. To evaluate the adequacy of contractor recommendations for provisioning of spares, AFAA selected for review 21 line items with initial procurements totaling \$8 million for the C-17 aircraft. For the B-2 aircraft, AFAA selected two samples of items for review: 100 percent review of 14 aircraft spare parts with a unit cost of \$1 million or more and a statistical sample of 45 of 1,053 aircraft spare parts with a unit cost of \$10,000 to \$999,999. AFAA determined whether the contractor properly developed and the Air Force effectively used maintenance factors to acquire initial spare parts for the C-17 aircraft. For the B-2 aircraft, AFAA evaluated procedures management used to validate contractor-provided maintenance factors. These audits were made from June 1990 through February 1991.

Internal Controls

The audits identified material internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. Controls were not established or effective to ensure that contractor forecasting factors for spares provisioning were received and reviewed in a timely and systematic manner and that adjustments to and nonuse of contractor factors were justified and documented. In addition, controls were not established to provide for post-evaluations of provisioning so that reliability of contractor recommendations could be evaluated. The recommendations in this report, if implemented, will assist in correcting these weaknesses. No additional quantifiable monetary benefits are identified in this report. A copy of the final report will be provided to the senior official responsible for internal controls within the Office of the Secretary of Defense (OSD).

Prior Audits and Other Reviews

Prior audits have not focused on the timeliness and use of contractor's estimates and forecasting data for initial provisioning of end items, but have indicated that contractor provisioning estimates were not always sound. IG, DoD, Quick-Reaction Report No. 90-050, "Requirements for Wholesale Inventories to Support the Target Acquisition Designation Sight/Pilot Night Vision Sensor System," March 23, 1990, stated that Aviation Systems Command accepted unverified contractor estimates to develop procurement quantities for the System. As a result, procurement quantities were overstated by \$11.9 million. The General Accounting Office (GAO) disclosed in Report No. GAO/NSIAD-90-294, OSD Case No. 8311-B, "Apache Helicopter: Serious Logistical Support Problems Must Be Solved to Realize Combat Potential," October 1, 1990, that shortages of primary components were due partially to failures of the components not being forecasted by the contractor. The above reports did not make recommendations regarding contractor recommendations for spares provisioning.

AFAA issued two audit reports that addressed contractor recommendations for spares provisioning of aircraft spares: "Management of C-17 Initial Provisioning," December 30, 1991, and "B-2 Initial Provisioning," January 17, 1992. These reports are discussed in Part II of this report.

In March 1989, the Under Secretary of Defense for Acquisition directed the ASD (P&L) to perform a comprehensive review of the provisioning process. The results of the review were published in the "Provisioning and Process Review Study Report," May 1990. The report concluded that the Military Departments needed a more efficient provisioning process and recommended a plan to improve the process. The report did not specifically address the reliability of contractor recommendations for provisioning of spares and other secondary items.

PART II - FINDING AND RECOMMENDATIONS

CONTRACTOR RECOMMENDATIONS FOR SPARES PROVISIONING

The Military Departments did not consistently validate and use contractor-provided maintenance factors in determining spares provisioning and procurement requirements for five major aircraft systems. Additionally, the Military Departments neither retained pertinent documentation for these requirements nor conducted post-evaluations of provisioning to determine the adequacy of contractor and Government factors used in determining spares requirements. We attributed this to a lack of DoD guidance for the validation and use of contractor provided factors, performance of post-evaluations of procurements of provisioned spares, and retention of pertinent documentation. As a result, over-procurement of provisioned items, totaling at least \$43 million, has occurred for the F-16 C/D aircraft. Other significant over- and under-procurements of provisioned items totaling \$30 million and \$20 million, respectively, were identified for the Apache helicopter. Further, without post-evaluations, inappropriate procurements of provisioned spares could be perpetuated for future weapon systems.

DISCUSSION OF DETAILS

Background

The Military Departments solicited estimates of various forecasting factors, including the maintenance factor, from the prime contractor for use in determining procurement requirements for spares provisioning of aircraft systems. The maintenance factor for aircraft measures the frequency of depot repair or replacement of an item per 100 flying hours and is used to estimate demands on the supply system. DoD policy on the use of contractor factors in determining spares provisioning requirements was undergoing significant revision at the time of our audit.

Results of Various Audits

IG, DoD, and AFSA audits disclosed overall that the Military Departments did not effectively use maintenance and other forecasting factors solicited from the contractor for spares provisioning of the Apache helicopter (IG Report No. 91-104), F/A-18 C/D aircraft (IG Report No. 92-053), F-16 C/D aircraft (IG Report No. 92-016), C-17 aircraft (AFSA Project No. 90063040), and B-2 aircraft (AFSA Project No. 90063042).

These reports showed that the Military Departments did not validate the accuracy of contractor factors. Furthermore, with the exception of the three Air Force systems reviewed, the Military Departments did not retain documentation to show what forecasting factors were provided by the contractor and how the factors were used in determining spares requirements. Additionally, the Military Departments did not perform post-evaluations of spares provisioning. (Appendices A, B, C, and D contain summaries of the above reports.)

Provisioning Procedures and Policy

We attributed the Military Departments' inconsistent validation and use of contractor-provided maintenance factors to several procedural and policy deficiencies as discussed below.

Evaluation and use of contractor factors. Neither DoD nor the Military Departments had written procedures or policy guidelines to provide for a prompt and systematic review and evaluation of contractor-provided forecasting factors for spares provisioning of the aircraft systems. The scope and depth of the Military Departments' evaluations were not defined to ensure that contractor factors were properly evaluated for reasonableness. In addition, contractors were not required to provide the basis of maintenance factors and other usage data for the Military Departments' review.

The Military Departments were also not required to use contractor-provided factors or to document evaluation results relative to modifying the factors. For example, our review of provisioning procurements for 23 line items of F-16 C/D aircraft spares totaling \$92.7 million showed that the Air Force used only 1 of 23 contractor-provided provisioning factors resulting in over-procurements totaling \$43 million.

Retention of provisioning documentation. The Military Departments and DoD's policies did not provide for development and retention of documentation portraying how contractor forecasting factors were evaluated and used in determining spares provisioning requirements. Army and Navy policies provided that provisioning documentation be retained for only 3 years and 2 years, respectively. These limited periods precluded retention of documentation in support of initial provisioning actions that occurred 7 or more years before contractor-provided factors could be evaluated against actual usage data. Air Force policy did not specify the period of retention for provisioning documentation.

As a result of inadequate retention policy, complete documentation was not available for effective post-evaluation of spares provisioned for the Apache helicopter and F/A-18 C/D aircraft.

Post-evaluations of provisioning. No DoD or Military Department policies provided for post-evaluation of provisioning decisions and for a centrally managed data base for post-evaluation results. Consequently, the adequacy of contractor forecasting factors and the Military Departments' use of and revisions to these factors were not evaluated; and the Military Departments were unable to use "lesson learned" data to improve the provisioning process. Additionally, neither the Office of the Secretary of Defense nor the Military Departments had criteria to measure the quality of contractor provided factors to be used in post-evaluations.

Centrally managed data base. We believe that the Military Departments need a single centrally managed data base for collection and dissemination of post-evaluation results of spares provisioning. If results were readily available, acquisition logistics managers would be in a better position to evaluate the accuracy of contractor forecasting factors and Government changes to these factors in determining future requirements for provisioning and procurement of new system spares. The Military Departments would be able to retrieve information from the data base in a variety of formats based on needs of a manager. For example, the data base could be used to identify the reliability of contractor-provided factors by type of system, subsystem, and individual contractor.

DoD Initiatives

The Office of the ASD (P&L) has formulated a draft of a new materiel management directive that requires Military Department materiel managers to maintain historical experience data so that comparisons between estimated provisioning factors (contractor or Government) and actual factors can be made. Managers would be required by the directive to document the basis of changes made to forecasting data and logistics requirements developed during the weapon system acquisition process. The Military Departments would also be required to retain documentation that portrays how contractor and Government factors were evaluated and used in determining provisioning and procurement requirements. We believe that the proposed directive should also specify that Military Departments use contractor-provided factors in

determining spares provisioning and procurement requirements unless such nonuse is justified and provide for post-evaluations of provisioning.

RECOMMENDATIONS FOR CORRECTIVE ACTIONS

We recommend that the Assistant Secretary of Defense (Production and Logistics) revise the draft materiel management directive to require, as a minimum, that:

1. The Military Departments validate and use contractor-provided factors in determining provisioning and procurement requirements unless such nonuse is justified in writing and approved by logistics or program managers.

2. The Military Departments perform post-evaluation of high-dollar (designated thresholds) procurements of provisioned spares to determine the accuracy of contractor-provided factors and to evaluate the Military Departments' use of the factors in determining spares requirements for provisioning and procurement.

3. Post-evaluation criteria be established for measuring the quality of contractor-provided factors and the rationale of Military Departments' decisions to modify those factors when used in determining provisioning requirements.

4. A centralized data base be maintained for results of post-evaluations of spares provisioning for use in future spares provisioning of new weapon systems.

MANAGEMENT COMMENTS AND AUDIT RESPONSE

Assistant Secretary of Defense (Production and Logistics) comments. The Assistant Secretary concurred with Recommendations 1., 3., and 4. and partially concurred with Recommendation 2. In response to Recommendation 2., the Assistant Secretary claimed that existing policy required post-deployment logistics reviews to include assessing the adequacy of provisioning. He stated that post-deployment assessments were not consistently done due to a lack of field feedback systems and resources. The Assistant Secretary believes that the situation will be improved because the Corporate Information Management

System will allow managers to assess the accuracy of contractor provided factors versus actual demand data. The complete text of the Assistant Secretary's comments is in Part IV.

Audit Response. We agree with the Assistant Secretary's comments on Recommendation 2. and the planned action. However, the Assistant Secretary did not comment on that portion of Recommendation 1. to have nonuse of contractor provided factors justified in writing and approved by logistics or program managers. We request that the Assistant Secretary address that portion of Recommendation 1. and describe planned corrective actions. Additionally, we request target completion dates for all planned actions.

PART III - ADDITIONAL INFORMATION

- APPENDIX A - Summary of Our Audit in Army
- APPENDIX B - Summary of Our Audit in Navy
- APPENDIX C - Summary of Our Audit in Air Force
- APPENDIX D - Summary of Air Force Audit Agency Reports
- APPENDIX E - Summary of Potential Benefits Resulting
from Audit
- APPENDIX F - Activities Visited or Contacted
- APPENDIX G - Report Distribution

APPENDIX A: SUMMARY OF OUR AUDIT IN ARMY

AUDIT REPORT NO. 91-104
CONTRACTOR RECOMMENDATIONS FOR APACHE SPARES PROVISIONING
(June 24, 1991)

Background. The Army Materiel Command (the Command), for spares provisioning, required its contractors to recommend the items needed for initial support of a given end item and determine whether items were already stocked by DoD or were new candidates for procurement. Contractors were also required to provide predictions of maintenance factors and other management data for development of spares requirements. Army Commodity Support Commands used contractor recommendations to determine quantities of parts to be procured for new systems. Initial and follow-on provisioning of spare and repair parts for the Army's Apache helicopter totaled about \$500 million for FY 1985 through FY 1990.

Objective. The audit objective was to determine if the Army was receiving adequate and timely data on provisioning of spares from contractors to serve as a sound basis for initial purchase of parts for new weapon systems. We also determined the effectiveness of internal control procedures in place to review and evaluate the quality of contractor estimates and forecasting data before approving procurement of the initial quantities. To accomplish the audit objective, we focused on the Apache helicopter.

Audit Results. The Command has significantly over- and under-procured spares for provisioning of the Apache helicopter in the amounts of \$30 million and \$20 million, respectively. The Command did not have internal controls to ensure that timely and reliable recommendations were received from contractors for spares provisioning. Also, the Command procedures did not require retention of pertinent documentation so that post-evaluations of spares provisioning could be made. This condition was considered a material internal control weakness. In the absence of pertinent documentation for requirements determinations, reasons for inappropriate procurements for the Apache helicopter could not be determined so that future provisioning for new systems could be improved.

APPENDIX A: SUMMARY OF OUR AUDIT IN ARMY (cont'd)

Potential Benefits of Audit. The audit did not disclose quantifiable monetary benefits. However, recommended improvements in the provisioning process should result in more accurate procurements of spares in future provisioning of new systems.

Summary of Recommendation. We recommended that procedures be established to provide for retention of documentation that portrays how contractor and Army factors were evaluated and used in determining spares provisioning requirements for at least high dollar items.

Management Comments. The Army concurred with the finding and recommendation.

APPENDIX B: SUMMARY OF OUR AUDIT IN NAVY

AUDIT REPORT NO. 92-053
CONTRACTOR RECOMMENDATIONS FOR SPARES PROVISIONING
OF THE F/A-18 C/D AIRCRAFT
(February 21, 1992)

Background. The Naval Air Systems Command, for spares provisioning of the F/A-18 C/D aircraft, required the prime contractor to recommend the items needed for initial support of the aircraft and to determine whether the items were already stocked by DoD or were new candidates for procurement. The contractor was also required to provide forecasting factors to the Naval Aviation Depot, North Island, for review and approval prior to submission to the Navy Aviation Supply Office for use in its requirements computation model.

Objective. The audit objective was to determine if the Navy was receiving adequate and timely data on provisioning of spares from contractors to serve as a sound basis for initial purchase of parts for new weapon systems. We also determined the effectiveness of internal control procedures in place to review and evaluate the quality of contractor estimates and forecasting data before approving procurement of the initial quantities. To accomplish the audit objective, we focused on the F/A-18 C/D aircraft. The budget for the acquisition and logistics support of 1,200 aircraft was \$38 billion.

Audit Results. For the F/A-18 C/D aircraft Stores Management System, the Navy Aviation Supply Office initially used maintenance factors for spares provisioning that were not approved by the Naval Aviation Depot, North Island. Also, documentation on the review and use of contractor maintenance factors was not retained. As a result, the Navy may have procured inappropriate quantities of aircraft spares. Further, by not retaining adequate documentation, post-evaluations of provisioning to improve the process in the future cannot be made.

Internal Controls. Internal controls were not in place to ensure that forecasting factors solicited from the contractor for spares provisioning were evaluated in a systematic manner and that adjustments to or nonuse of the contractor's factors were justified and documented. Also, procedures did not provide for post-evaluations of provisioning to improve the accuracy of forecasting factors used in determining procurement and future provisioning requirements.

APPENDIX B: SUMMARY OF OUR AUDIT IN NAVY (cont'd)

Potential Benefits of Audit. The audit did not identify any quantifiable monetary benefits. However, recommended improvements in the provisioning process should result in more accurate procurements of spares in future provisioning of new systems.

Summary of Recommendations. We recommended that procedures and controls be established to provide for review and use of contractor forecasting factors and retention of pertinent documentation.

Management Comments. The Navy concurred with the finding and two recommendations, nonconcurred with one recommendation, and offered an acceptable alternative to one recommendation. The Navy's nonconcurrence was based on its contention that Navy procedures provided for retention of documentation portraying how contractor recommendations were evaluated and used in developing spares provisioning requirements.

Audit Response. This matter has been resolved. The Navy agreed that the Naval Air Systems Command will instruct its system program offices to retain documentation showing how contractor recommendations were evaluated and used.

APPENDIX C: SUMMARY OF OUR AUDIT IN AIR FORCE

AUDIT REPORT NO. 92-016
CONTRACTOR RECOMMENDATIONS FOR SPARES PROVISIONING
OF THE F-16 C/D AIRCRAFT
(December 2, 1991)

Background. The Air Force Logistics Command (AFLC), now named the Air Force Materiel Command, for provisioning of spares, required responsible contractors to recommend the items needed for initial support of a given end item and to determine whether items were already stocked by DoD or were new candidates for procurement. Contractors were also required to provide forecasting factors and to use the factors in AFLC models to compute spares requirements. Provisioning of spares for the Air Force's F-16 C/D aircraft (excluding engines) totaled about \$174 million for FY 1982 through FY 1990.

Objective. The audit objective was to determine if the Air Force was receiving adequate and timely data on provisioning of spares from contractors to serve as a sound basis for initial purchase of parts for new weapon systems. We also determined the effectiveness of internal control procedures in place to review and evaluate the quality of contractor estimates and forecasting data before approving procurement of the initial quantities. To accomplish the audit objective, we focused on the F-16 C/D aircraft.

Audit Results. Contractor-developed forecasting factors were submitted promptly. However, AFLC did not implement DoD policy that required minimizing investment in spares provisioning.

- o Contractor-developed maintenance factors were not used to determine requirements for spares. Consequently, AFLC over-procured (\$43 million) for 23 line items of spares.

- o AFLC did not promptly cancel a procurement for spares when a decision was made to not use the Advanced Identification Friend or Foe system on the F-16 C/D aircraft. As a result, the Command could incur a contract termination cost of \$6 million.

Internal Controls. Procedures were not in place to ensure that forecasting factors solicited from contractors were evaluated in a systematic manner and that adjustments to or nonuse of the contractors' factors were justified. Forecasting factors for provisioning were not assessed when significant design

APPENDIX C: SUMMARY OF OUR AUDIT IN AIR FORCE (cont'd)

improvements occurred. AFLC procedures did not provide for post-evaluation of provisioning to improve the accuracy of maintenance factors used in determining procurements and future provisioning requirements. Also, controls were not present to require prompt assessment of the effects of program changes on provisioning requirements.

Potential Monetary and Other Benefits of Audit. A cost avoidance of up to \$2.4 million could be realized if 60 global positioning system antennas procured in excess of requirements for the F-16 C/D aircraft were used for the planned retrofit of F-16 A/B aircraft. A potential cost avoidance of up to \$7.9 million could also be realized by canceling procurements initiated since FY 1989 for six line items of aircraft landing gear spares. The procurements of the landing gear spares were based on forecasted maintenance factors that actual operational experience has proven to be overestimated. Recommended improvements in the provisioning process should result in more accurate procurements of spares in future provisioning of new systems.

Summary of Recommendations. We recommended that procedures be established to provide for minimizing investment in procurements for provisioning, for effectively using contractor forecasting factors for provisioning, and for assessing program changes on procurements for provisioned items.

Management Comments. The Air Force concurred with the findings and recommendations. The Ogden Air Logistics Center is assessing the global positioning system antenna needs for both the F-16 C/D and A/B programs and will use all excess antennas for the F-16 A/B program. Also, the Ogden Air Logistics Center has proceeded to terminate contracts for the F-16 C/D aircraft main landing gear and the rotor. The Air Force reported monetary savings of \$1.9 million to be realized in FY 1994 for the antennas.

APPENDIX D: SUMMARY OF AIR FORCE AUDIT AGENCY REPORTS

PROJECT NO. 90063040
MANAGEMENT OF C-17 INITIAL PROVISIONING
(December 30, 1991)

Background. AFLC, for spares provisioning of the C-17 aircraft, required the contractor to develop estimated maintenance factors for mature systems. Reliability growth curves were used to predict spare part maintenance factors for a system's initial support period in the provisioning computation. Using adjusted mature maintenance factor estimates, referred to as derated maintenance factors, helps to ensure that an adequate quantity of spare parts are on-hand during the less reliable phase in the life of a system. The budget for initial and war reserve materiel spares from FY 1988 through FY 1995 is approximately \$2 billion.

Objective. The objectives of the audit, regarding contractor maintenance factors for spares provisioning of the C-17 aircraft, were to determine the validity of key factors used in provisioning computations and the adequacy of provisioning for initial spares.

Audit Results. The contractor provided the AFLC with improperly developed maintenance factors for computation of initial provisioning requirements for the C-17 aircraft. This occurred because Air Force procedures did not require acquisition managers to define the methodology to be used by the contractor in derating its maintenance factors. Responsibilities for validating contractor derating factors are not assigned. Also, procedures did not identify data requirements that are necessary to accomplish oversight of derating by the contractor. Further, the contractor was provided an incorrect flying hour midpoint to develop the maintenance factors. As a result, initial spare parts quantities were overstated by about \$587,000 for 7 of 21 recoverable items reviewed.

Potential Benefits of Audit. The audit did not disclose quantifiable monetary benefits. However, recommended improvements in the provisioning process should result in more accurate procurements of spares in future provisioning of new systems.

APPENDIX D: SUMMARY OF AIR FORCE AUDIT AGENCY REPORTS (cont'd)

Summary of Recommendations. AFAA recommended that Air Force Regulation 800-36 be revised to ensure that contractors properly derate maintenance factors and that weapon system program managers properly validate contractor provided factors.

Management Comments. The Air Force concurred with the finding and recommendations.

APPENDIX D: SUMMARY OF AIR FORCE AUDIT AGENCY REPORTS (cont'd)

PROJECT NO. 90063042
B-2 INITIAL PROVISIONING
(January 17, 1992)

Background. AFLC, for spares provisioning of the B-2 aircraft required the contractor to develop estimated maintenance factors for mature systems. Reliability growth curves were used to predict spare part maintenance factors for a system's initial support period in the provisioning computation. Using adjusted mature maintenance factor estimates, referred to as derated maintenance factors, helps ensure that an adequate quantity of spare parts are on hand during the less reliable phase in the life of a system. The initial spares budget for both the B-2 aircraft and the engine from FY 1987 through FY 1999 was about \$2.8 billion.

Objective. The objectives of the audit, regarding contractor maintenance factors for spares provisioning of the B-2 aircraft, were to determine the appropriateness of computation methodologies and the validity of key factors used in computations.

Audit Results. The B-2 system program manager did not validate contractor-provided derated maintenance factors, and the contractor either provided no documentation or informal data to support the contractor factors. This occurred because the derating method and associated data requirements were not included in the B-2 contract. Consequently, the system program manager could not validate contractor assumptions concerning individual part reliability growth and repair part demands used in selecting a derating factor and inappropriate spares were procured.

Potential Benefits of Audit. The audit did not disclose quantifiable monetary benefits. However, recommended improvements in the provisioning process should result in more accurate procurements of spares in future provisioning of new systems.

Summary of Recommendation. AFAA recommended that AFLC validate contractor-provided maintenance factors used in determining spares provisioning requirements.

Management Comments. The Air Force concurred with the finding and recommendation.

APPENDIX E: SUMMARY OF POTENTIAL BENEFITS RESULTING FROM AUDIT

<u>Recommendation Reference</u>	<u>Description of Benefit</u>	<u>Type of Benefit</u>
1.	<u>Internal Control.</u> Ensure optimum purchases of spares for provisioning of new weapon systems.	<u>Nonmonetary.</u>
2.	<u>Internal Control.</u> Determine accuracy of contractor-provided factors for spares provisioning and the Military Departments' use of the factors in determining provisioning and procurement require- ments.	<u>Nonmonetary.</u>
3.	<u>Internal Control.</u> Ensure that adequate evaluations are made of contractor provisioning factors and of their use of the factors.	<u>Nonmonetary.</u>
4.	<u>Internal Control.</u> Provide a baseline for evaluating contractor provisioning factors for future spares provisioning of new weapon systems.	<u>Nonmonetary.</u>

APPENDIX F: ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Office of the Assistant Secretary of Defense (Production and Logistics), Washington, DC

Department of the Army

Deputy Chief of Staff for Logistics, Washington, DC
Headquarters, Army Materiel Command, Alexandria, VA
Aviation Systems Command, St. Louis, MO
Armament, Munitions, and Chemicals Command, Rock Island, IL

Department of the Navy

Deputy Chief of Naval Operations, Arlington, VA
Naval Air Systems Command, Arlington, VA
Aviation Supply Office, Philadelphia, PA
Naval Aviation Depot, North Island, San Diego, CA

Department of the Air Force

Deputy Chief of Staff (Logistics and Engineering), Washington, DC
Headquarters, Air Force Logistics Command, Wright-Patterson Air Force Base, OH
Aeronautical Systems Division, Wright-Patterson Air Force Base, OH
Ogden Air Logistics Center, Ogden, UT
Resident Integrated Logistics Support Activity, Fort Worth, TX
Sacramento Air Logistics Center, Sacramento, CA

Other Activities

McDonnell Douglas Helicopter Corporation, Mesa, AZ
McDonnell Aircraft Company, St. Louis, MO
General Dynamics Corporation, Fort Worth Division, Fort Worth, TX

APPENDIX G: REPORT DISTRIBUTION

Office of the Secretary of Defense

Assistant Secretary of Defense (Production and Logistics)
Assistant Secretary of Defense (Public Affairs)
Comptroller of the Department of Defense

Department of the Army

Secretary of the Army
Inspector General

Department of the Navy

Secretary of the Navy
Assistant Secretary of the Navy (Financial Management)
Auditor General, Naval Audit Service

Department of the Air Force

Secretary of the Air Force
Assistant Secretary of the Air Force (Financial Management and
Comptroller)
Air Force Audit Agency

Defense Agencies

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
Director, Defense Logistics Studies Information Exchange
Director, National Security Agency/Chief, Central Security
Service
Inspector General, Defense Intelligence Agency

Non-DoD Activities

Office of Management and Budget
U.S. General Accounting Office
National Security and International Affairs Division,
Technical Information Center
National Security and International Affairs Division,
Director for Logistics Issues

APPENDIX G: REPORT DISTRIBUTION (cont'd)

Chairman and Ranking Minority Member of the following
Congressional Committees and Subcommittees:

Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Operations
House Subcommittee on Legislation and National Security,
Committee on Government Operations

PART IV - MANAGEMENT COMMENTS

Office of the Assistant Secretary of Defense (Production and Logistics)

MANAGEMENT COMMENTS: ASSISTANT SECRETARY OF DEFENSE (PRODUCTION AND LOGISTICS)



PRODUCTION AND
LOGISTICS

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, DC 20301-8000

September 30, 1992

(L/SD)

MEMORANDUM FOR DOD INSPECTOR GENERAL

SUBJECT: Summary Audit Report on Contractor Recommendations for
Spares Provisioning (Project No. OLA-0025)

This memorandum responds to your July 9, 1992, request for comments on subject draft audit report. We are in general agreement with the findings and recommendations addressed in the draft report. Our detailed response is provided in the attachment.

We are encouraged that your findings endorse the pertinent policy changes included in the draft DoD Materiel Management Regulation. The requirement to assess contractor-provided factors and maintain better provisioning audit trails is prescribed by this new policy. Further, supporting your findings, the DoD Inventory Reduction Plan (IRP) requires the DoD Components to evaluate the accuracy of contractor estimates used for initial spares provisioning. Through strengthened policy and the IRP efforts, the Department is taking corrective actions to eliminate the problems identified in the draft report. These actions will cause more conservative initial spares requirements determination and provide improved management control tools to discipline the provisioning process.

We welcome your insights in identifying improvement opportunities in buying initial spares, and we appreciate the opportunity to comment on your draft report.

Colin L. McMillan 9/20/92
Acting ASO (PAL)
Colin McMillan

Attachment

MANAGEMENT COMMENTS: ASSISTANT SECRETARY OF DEFENSE (PRODUCTION AND LOGISTICS (cont'd)

Response to Finding and Recommendations
Project No. OLA-0025

FINDING: The Military Departments did not consistently validate and use contractor-provided maintenance factors in determining spares provisioning and procurement requirements for five major aircraft systems. Additionally, the Military Departments neither retained pertinent documentation for these requirements nor conducted post-evaluations to determine accuracy of factors used in determining spares requirements. This is attributed to a lack of DoD guidance, resulting in significant over- and under-procurements of provisioned items. Further, without post-evaluations, inappropriate procurements of provisioned spares could be perpetuated for future weapon systems.

DoD Response: Partially concur. We agree that the DoD Components have not consistently validated contractor-provided factors nor conducted post-evaluations to determine the accuracy of provisioning factors. Generally, these deficiencies can be attributed more to implementation deficiencies rather than a lack of guidance. Existing procedures require that requirements for provisioned support items be determined by using actual failure or test data when available to supplement maintenance factors provided by contractors. Evaluation of the accuracy of provisioning factors is a standard function inherent in the transition from requirements based on engineering estimates to actual experience data. Further, the DoD Components have several post-deployment logistics review mechanisms that assess, among other factors, the effectiveness of supply support. A major reason for these logistics reviews is to provide lessons learned and predecessor system information to follow-on systems. Detailed evaluations of the accuracy of provisioning factors have been rarely performed against an entire weapon system because of the data intensity of such a requirement and the difficulty in capturing actual field experience.

We concur with the overall assessment of the draft report. Through the results of the DoD Provisioning Process Review, the problems highlighted in the draft report have already been identified with several initiatives and policy changes underway to address these deficiencies. Specific initiatives required by the DoD Inventory Reduction Plan include:

- * Evaluating accuracy of contractor estimates used for initial sparring
- * Implementing Provisioning Performance Measures Procedures
- * Computing initial spares requirements based on Weapon System/Equipment Readiness Objectives.

ATTACHMENT

MANAGEMENT COMENTS: ASSISTANT SECRETARY OF DEFENSE (PRODUCTION AND LOGISTICS (cont'd)

The Department supports the need for more efficiency and accuracy in the provisioning process. Policy strengthening and DoD Service/Agency continued implementation of the IRP are fundamental to making progress.

RECOMMENDATION 1: The Military Departments validate and use contractor-provided factors in determining provisioning and procurement requirements unless such non-use is justified in writing and approved by logistics or program managers.

DoD Response: Concur. The Department has incorporated policy changes in the draft of the DoD Materiel Management Regulation that respond to this need. The applicable new policy requirements are:

Materiel managers will ensure that any proposed changes to the engineering data or logistics planning, as reflected in the Logistics Support Analysis Record (LSAR), are documented and provided to the logistics manager for coordination prior to implementation.

Logistics managers will maintain an audit trail of any changes that are made (to engineering data or other logistics factors), to include the rationale for change. Appropriate feedback will be provided to the weapon system manager and be maintained as part of the weapon system historical file.

Materiel managers will maintain weapon system application files containing actual weapon system experience data that can be compared directly to predicted values used during the system acquisition process for reliability, maintainability, and system readiness. Measures of key supply system performance and pipeline times will also be maintained for use in logistics support analysis and other related analysis.

Each of the individual Services is developing procedures and implementing actions to validate and use contractor-provided estimates and justify non-use of these factors as required.

RECOMMENDATION 2: The Military Departments perform post-evaluation of high dollar (designated thresholds) procurements of provisioned spares to determine the accuracy of contractor-provided factors and to evaluate the Military Departments' use of the factors in determining spares requirements for provisioning and procurement.

MANAGEMENT COMMENTS: ASSISTANT SECRETARY OF DEFENSE (PRODUCTION AND LOGISTICS (cont'd)

DoD Response: Partially Concur. DoD Components currently are required to perform post-deployment logistics reviews, to include assessing the adequacy of provisioning. However, implementation of this requirement has been inconsistent due to inadequate field feedback systems and lack of resources to perform post-deployment assessments. The Department plans to improve this situation through Corporate Information Management (CIM) capabilities which will provide standardized data by weapon system and enhance management information outputs. This will allow managers throughout the weapon system life cycle to perform many types of performance assessments, among them, comparative analysis of the accuracy of contractor provided factors vs. actual demand data. These assessments may be employed focusing on high dollar items, readiness drivers, or other weapon system performance factors.

RECOMMENDATION 3: Post-evaluation criteria be established for measuring the quality of contractor-provided factors and the rationale of Military Departments' decisions to modify those factors when used in determining provisioning requirements.

DoD Response: Concur. Policy requirements to develop and maintain provisioning performance measures have been included in the draft DoD Materiel Management Regulation. Specifically, DoD Components will develop standard measures that will enable them to determine the accuracy of provisioning buys. Fundamental to making that determination is the requirement to measure the accuracy and timeliness of contractor-provided factors.

As expressed in Recommendation #1, policy changes and DoD Components' implementing actions are underway to justify the rationale for deviation from contractor-provided data.

RECOMMENDATION 4: A centralized data base be maintained for results of post-evaluations of spares provisioning of new weapon systems.

DoD Response: Concur. Logistics Corporate Information Management (CIM) functional requirements include a data base to retain an audit trail of decisions and changes to data throughout the life cycle as well as a source of "similar and same" data for comparative analysis. The specific content and scope of this data base will be further defined and refined as the 3-5 year logistics CIM program requirements are developed and incorporated into standard systems.

LIST OF AUDIT TEAM MEMBERS

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